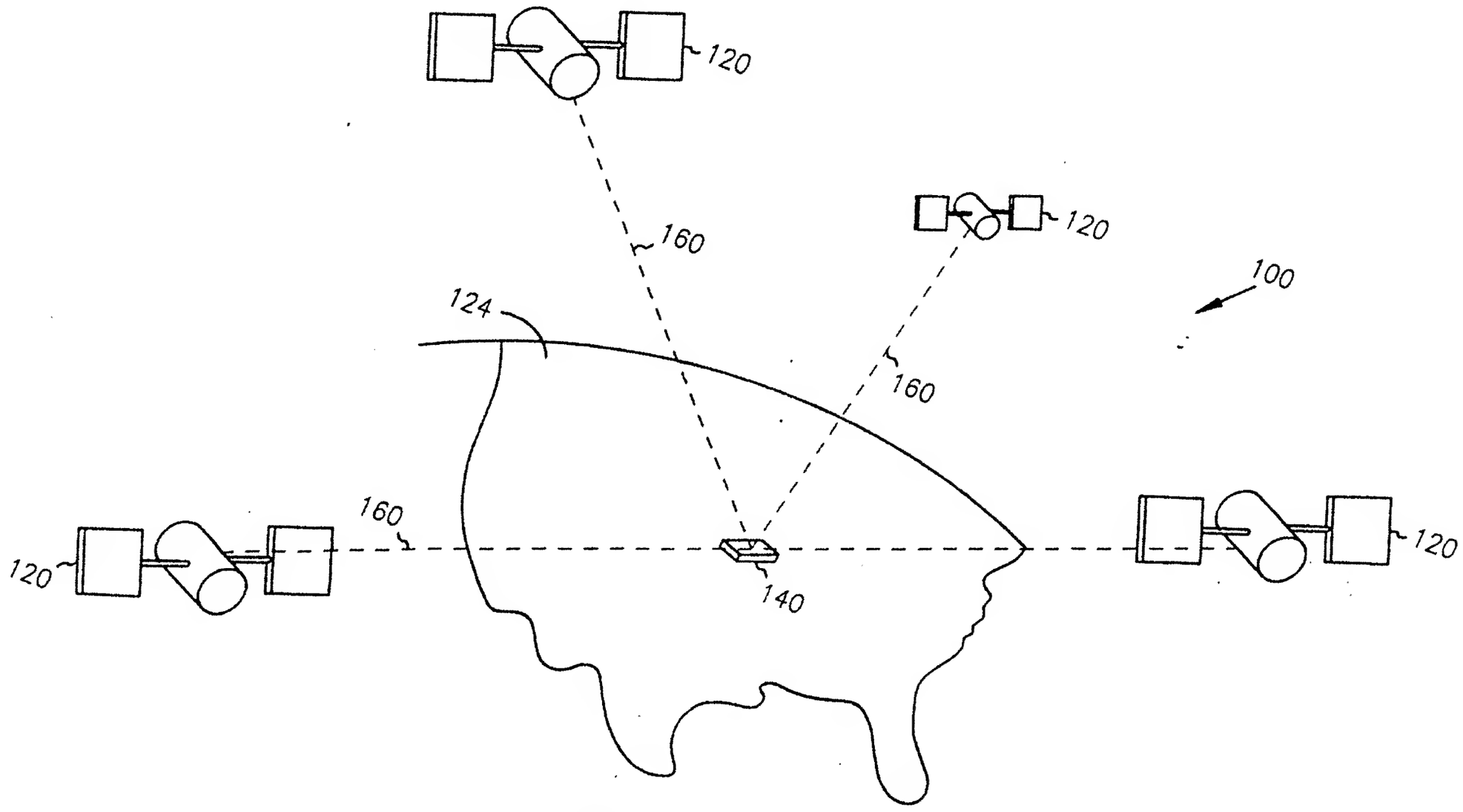

FIG. 1

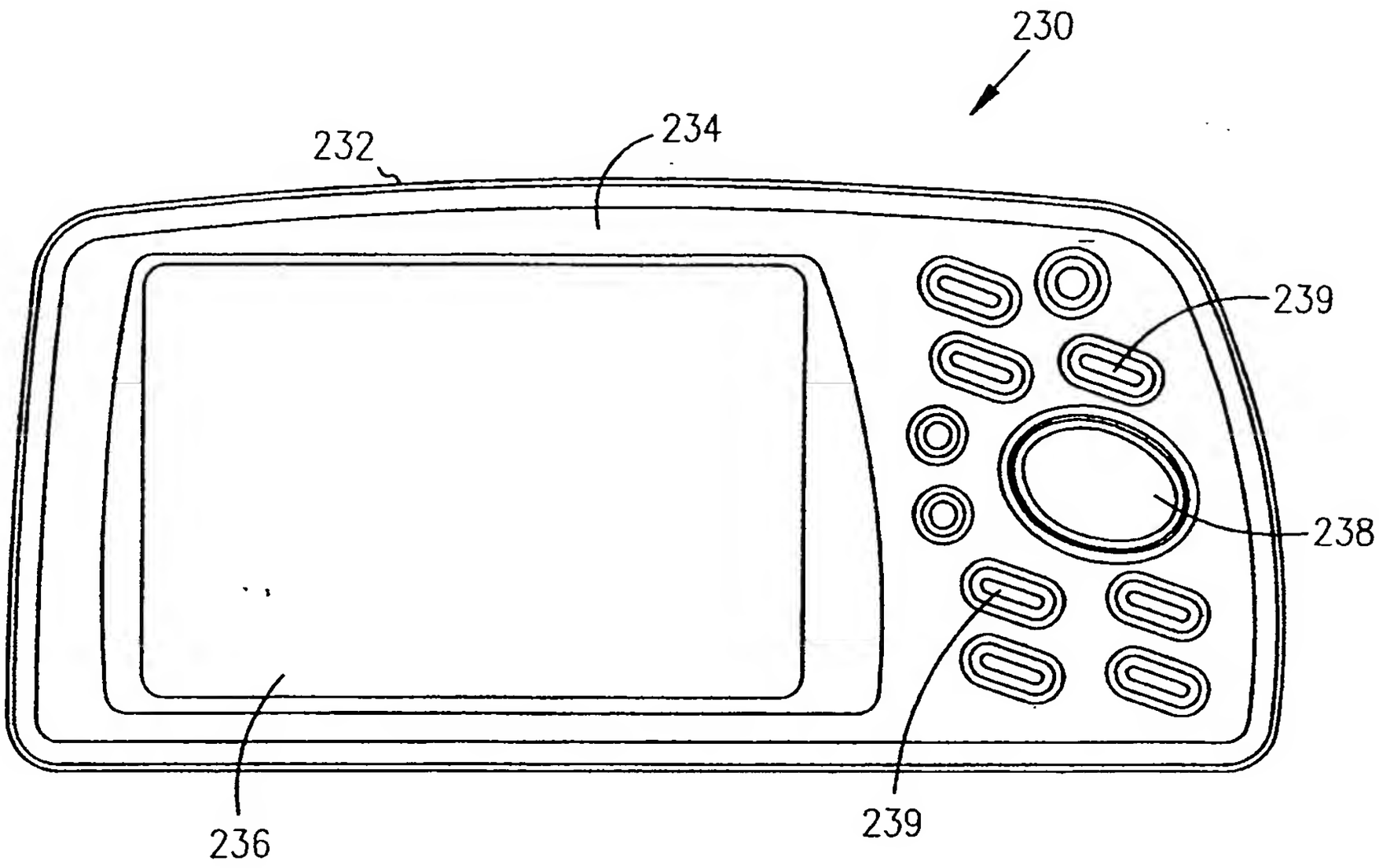

FIG. 2A

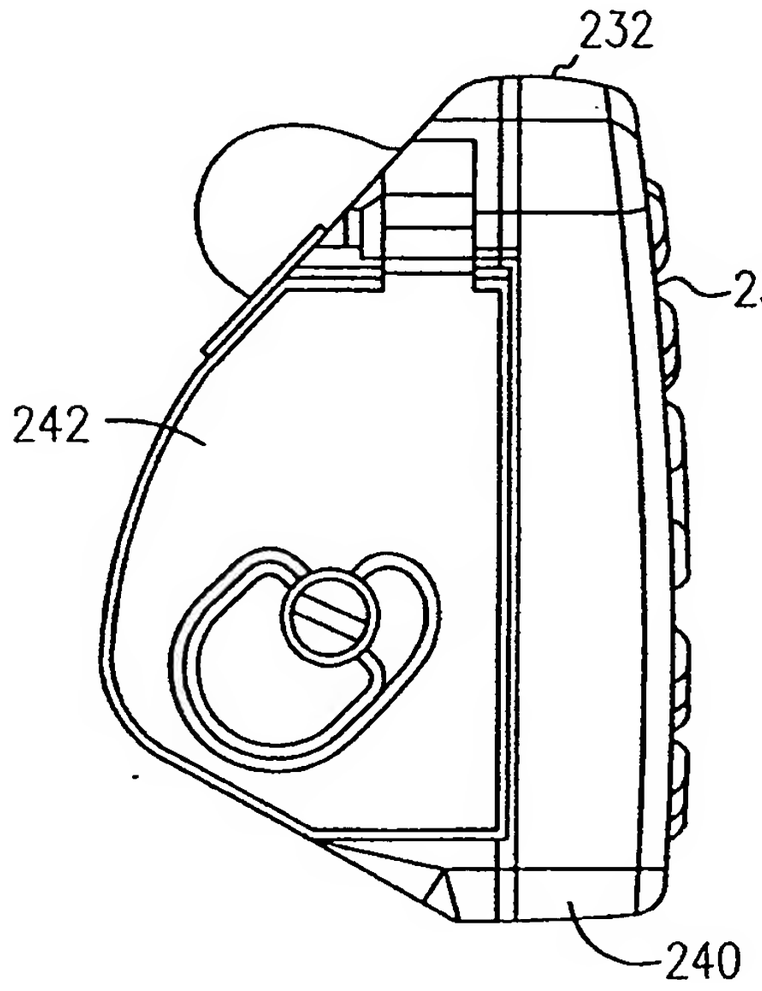

FIG. 2B

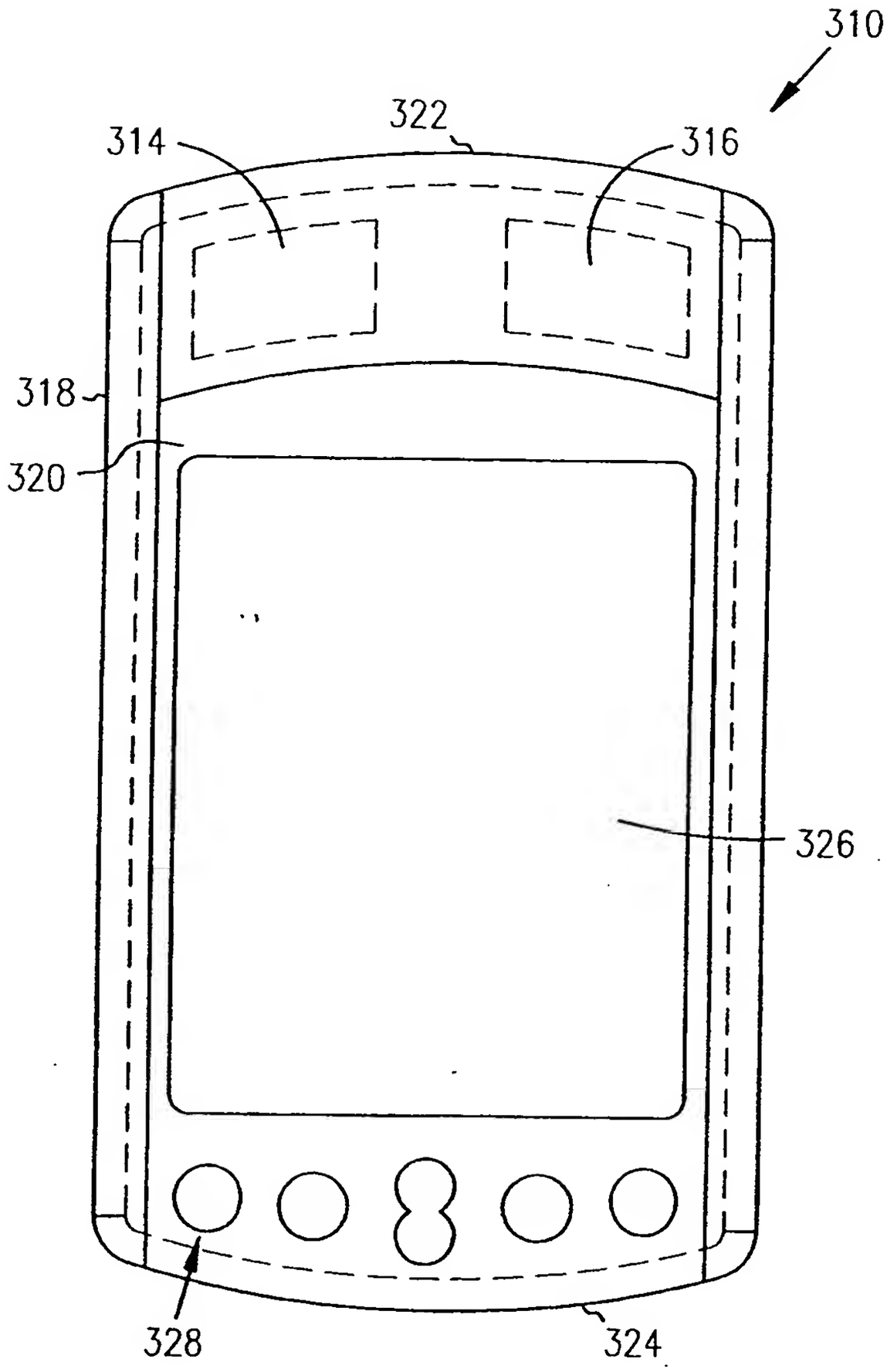

FIG. 3A

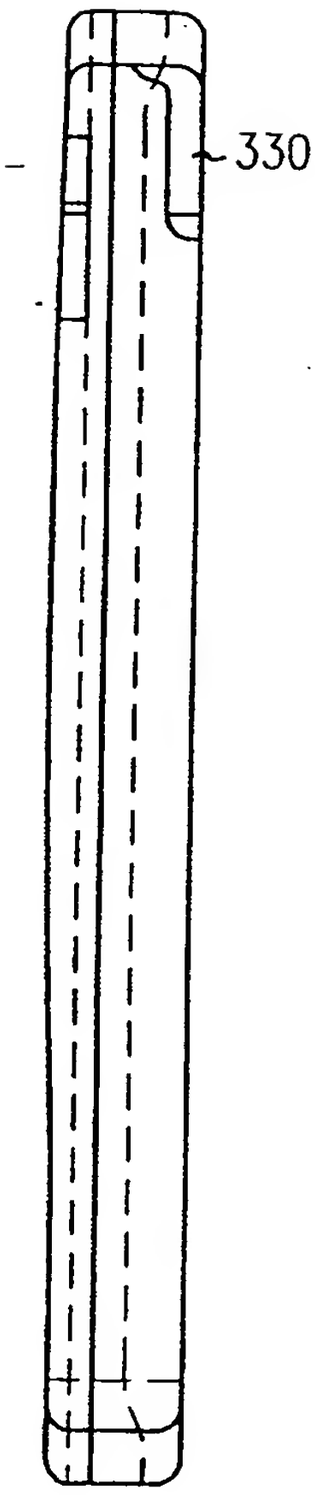

FIG. 3B

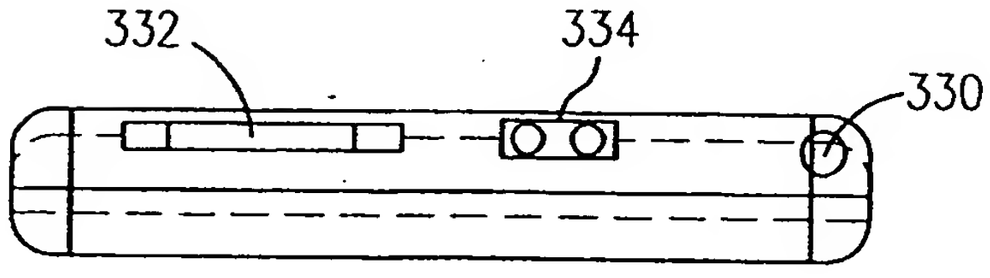

FIG. 3C

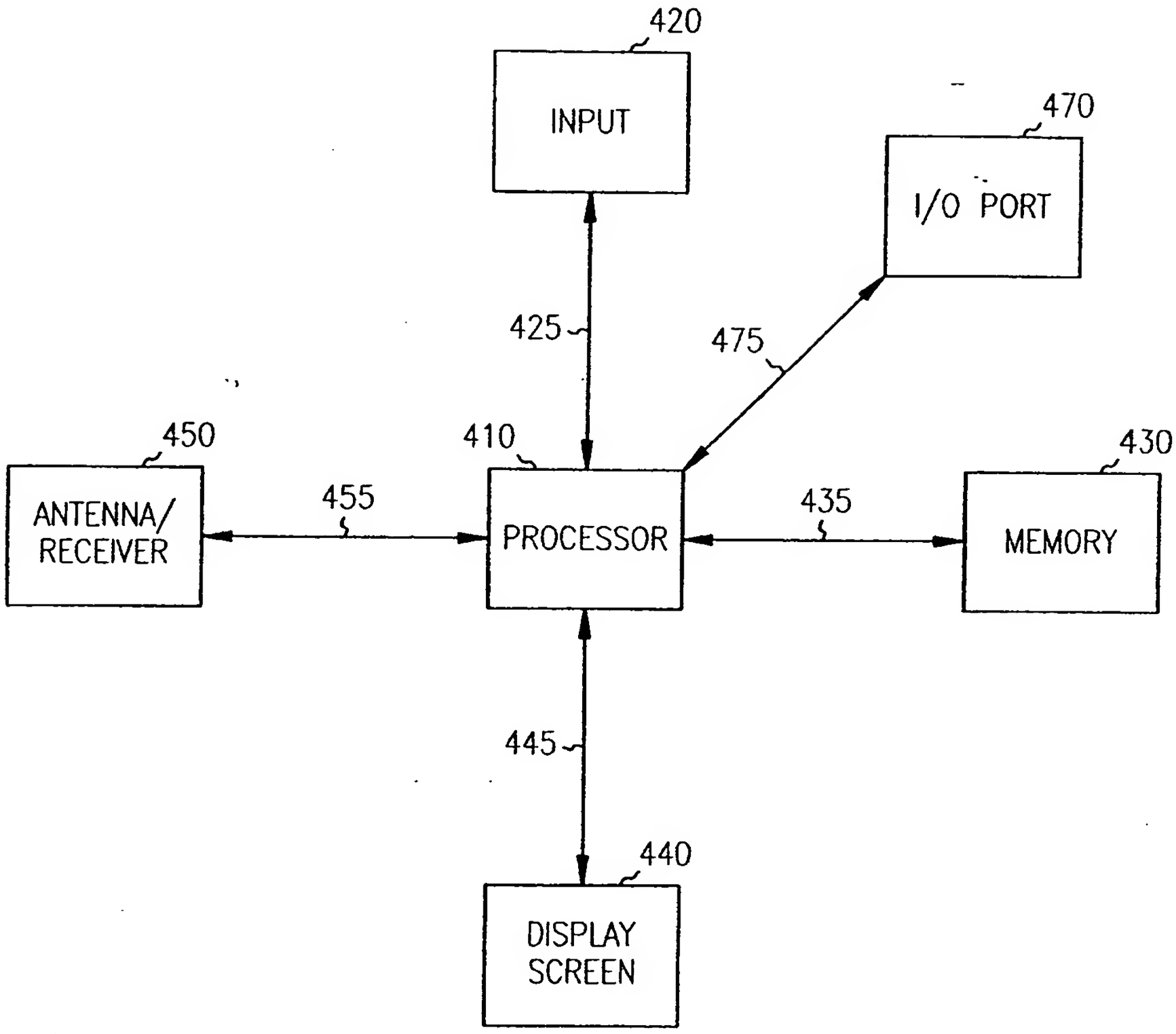
420
INPUT
470
I/O PORT
425
475
450
410
430
ANTENNA/
RECEIVER
455
PROCESSOR
435
MEMORY
445
440
DISPLAY
SCREEN

FIG. 4A

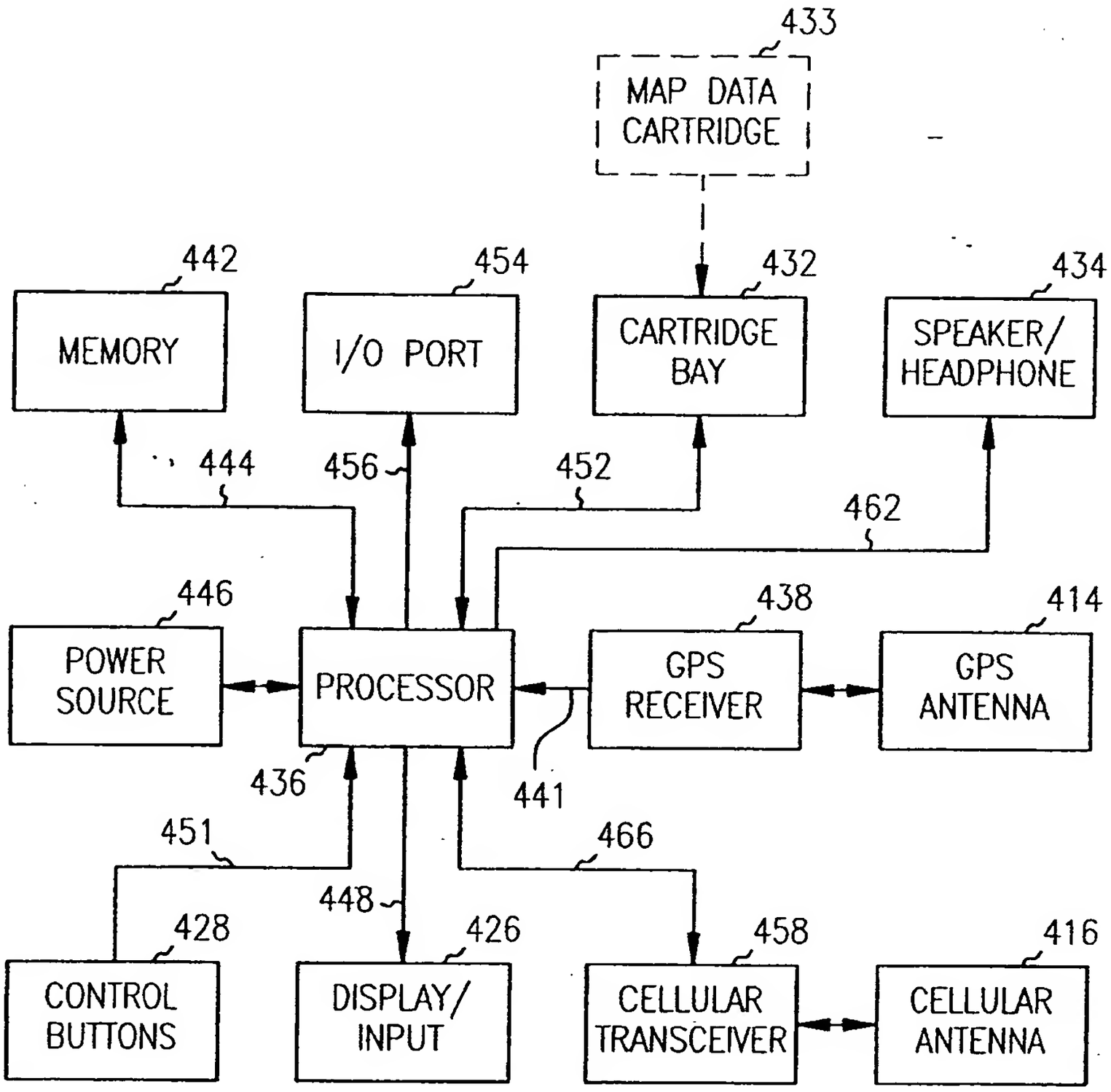
433
MAP DATA CARTRIDGE
442
MEMORY
454
I/O PORT
432
CARTRIDGE BAY
434
SPEAKER/ HEADPHONE
444
456
452
462
446
POWER SOURCE
PROCESSOR
438
GPS RECEIVER
414
GPS ANTENNA
436
441
451
466
448
428
CONTROL BUTTONS
426
DISPLAY/ INPUT
458
CELLULAR TRANSCEIVER
416
CELLULAR ANTENNA

FIG. 4B

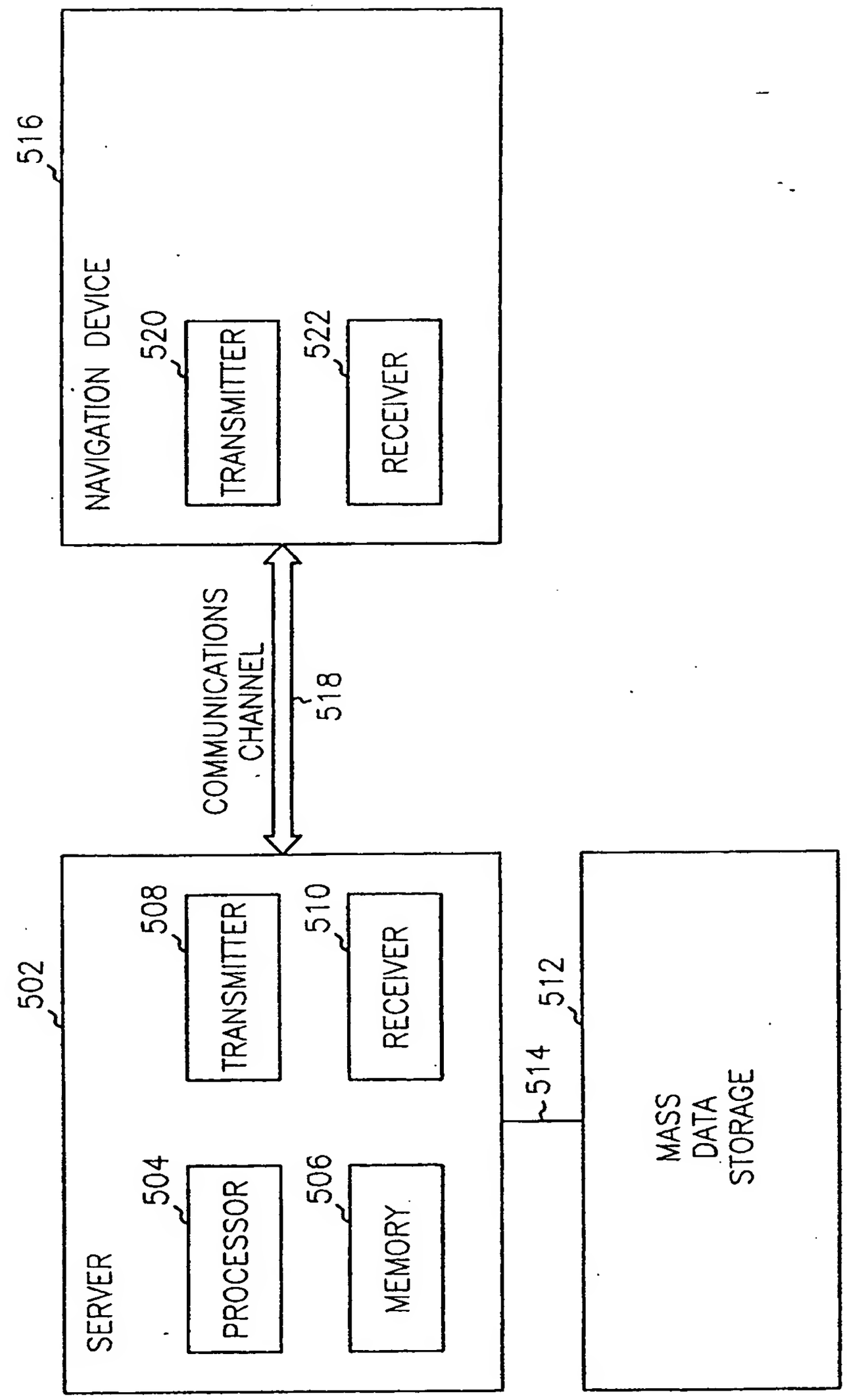
502
SERVER
504
PROCESSOR
506
MEMORY
508
TRANSMITTER
510
RECEIVER
512
514
MASS DATA STORAGE
COMMUNICATIONS CHANNEL
518
516
NAVIGATION DEVICE
520
TRANSMITTER
522
RECEIVER

FIG. 5

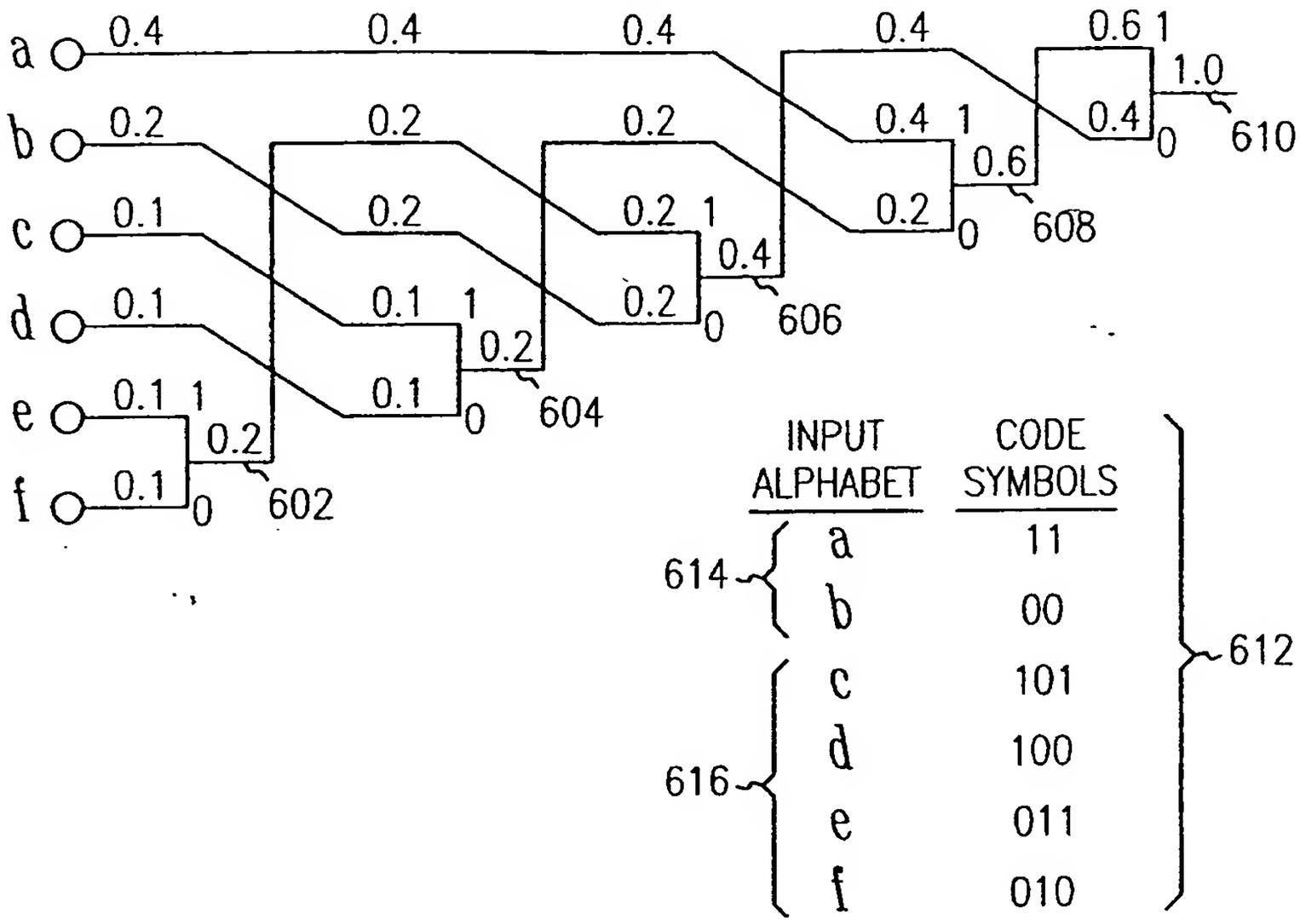

FIG. 6
(PRIOR ART)

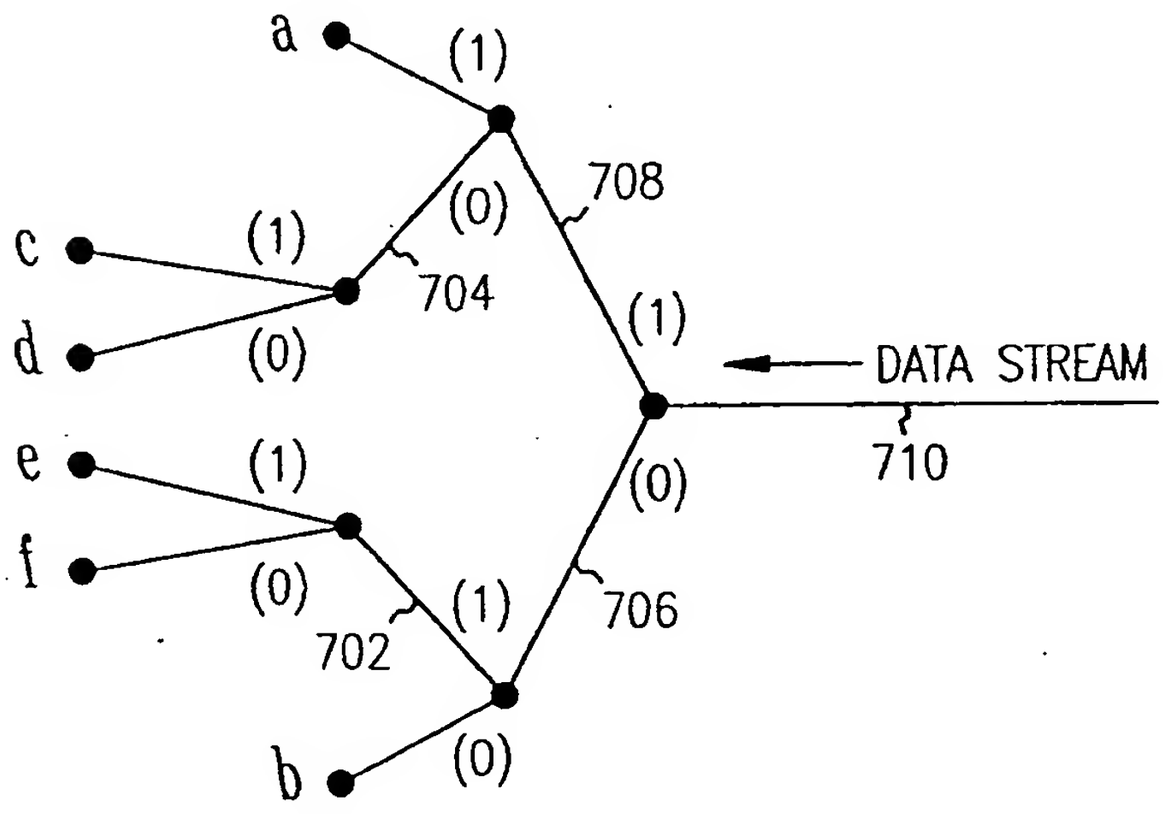

FIG. 7
(PRIOR ART)

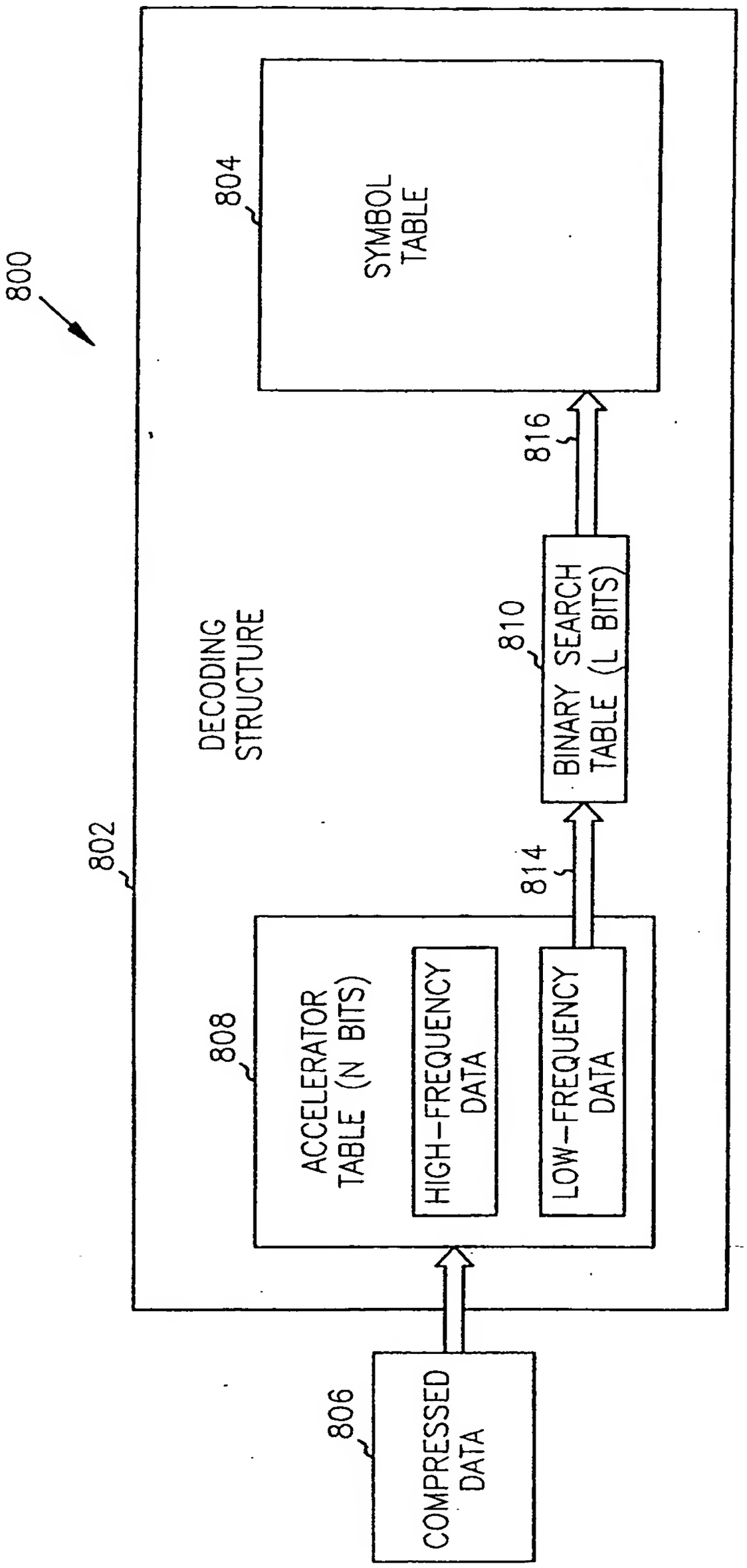
800
802
804
SYMBOL TABLE
DECODING STRUCTURE
808
ACCELERATOR TABLE (N BITS)
HIGH-FREQUENCY DATA
LOW-FREQUENCY DATA
814
810
BINARY SEARCH TABLE (L BITS)
816
806
COMPRESSED DATA

FIG. 8

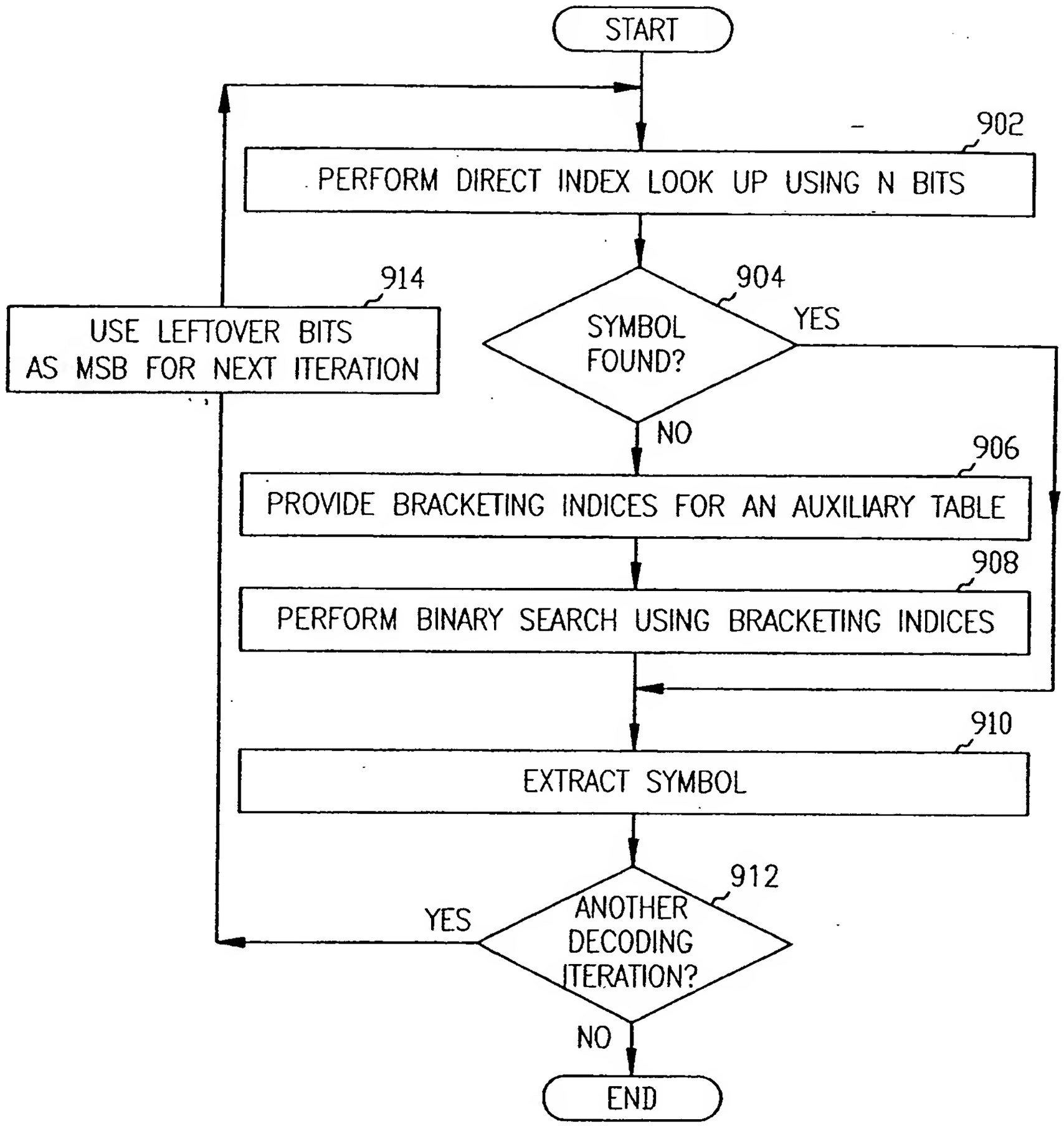
START
902
PERFORM DIRECT INDEX LOOK UP USING N BITS
914
USE LEFTOVER BITS
AS MSB FOR NEXT ITERATION
904
SYMBOL
FOUND?
YES
NO
906
PROVIDE BRACKETING INDICES FOR AN AUXILIARY TABLE
908
PERFORM BINARY SEARCH USING BRACKETING INDICES
910
EXTRACT SYMBOL
912
ANOTHER
DECODING
ITERATION?
YES
NO
END

FIG. 9

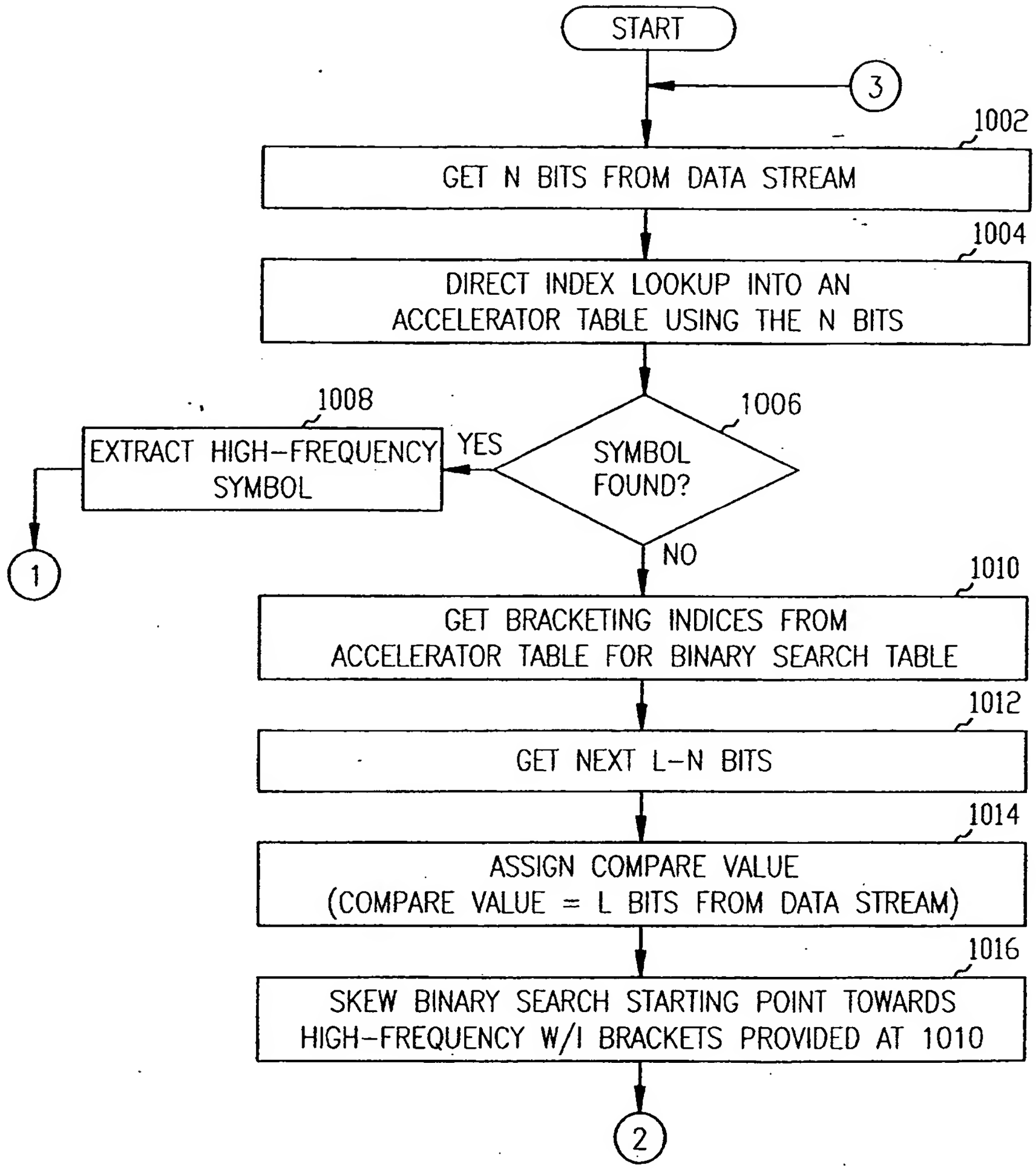
START
3
1002
GET N BITS FROM DATA STREAM
1004
DIRECT INDEX LOOKUP INTO AN ACCELERATOR TABLE USING THE N BITS
1006
SYMBOL FOUND?
YES
1008
EXTRACT HIGH-FREQUENCY SYMBOL
1
NO
1010
GET BRACKETING INDICES FROM ACCELERATOR TABLE FOR BINARY SEARCH TABLE
1012
GET NEXT L-N BITS
1014
ASSIGN COMPARE VALUE (COMPARE VALUE = L BITS FROM DATA STREAM)
1016
SKEW BINARY SEARCH STARTING POINT TOWARDS HIGH-FREQUENCY W/I BRACKETS PROVIDED AT 1010
2

FIG. 10A

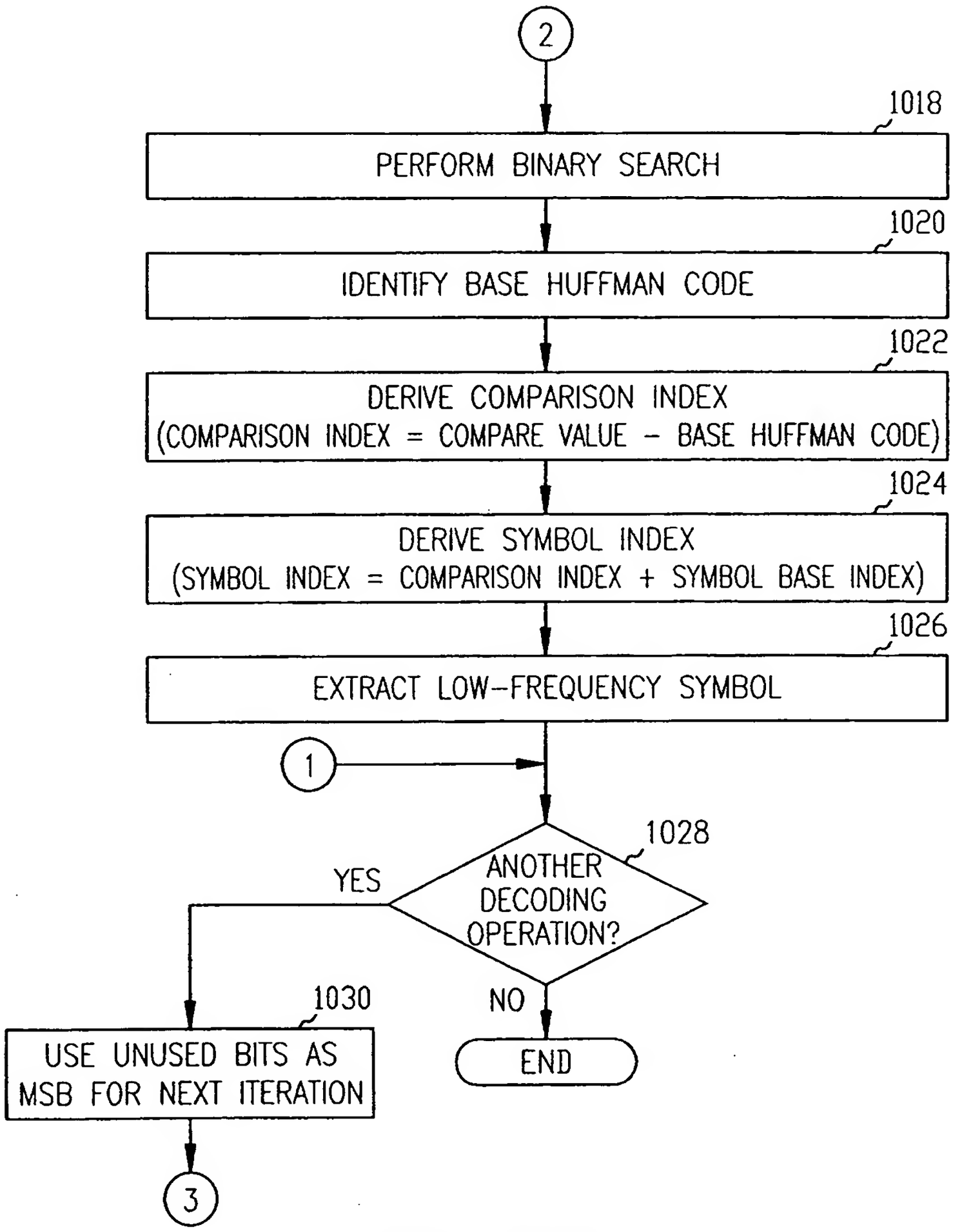
2
1018
PERFORM BINARY SEARCH
1020
IDENTIFY BASE HUFFMAN CODE
1022
DERIVE COMPARISON INDEX
(COMPARISON INDEX = COMPARE VALUE - BASE HUFFMAN CODE)
1024
DERIVE SYMBOL INDEX
(SYMBOL INDEX = COMPARISON INDEX + SYMBOL BASE INDEX)
1026
EXTRACT LOW-FREQUENCY SYMBOL
1
1028
ANOTHER DECODING OPERATION?
YES
NO
END
1030
USE UNUSED BITS AS MSB FOR NEXT ITERATION
3

FIG. 10B

1102	ASSIGNED CANONICAL HUFFMAN CODE (MSB … LSB)	BIT LENGTH	SYMBOL	SYMBOL INDEX
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	16	0x01	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1	-	0x1D	1
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0		','	2
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1		'.'	3
	0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0	14	0x02	4
	0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1			
	0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0		'/'	5
	0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1	13	0x03	6
	0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0	12	'_'	7
	0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1		'Q'	8
	0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0		'X'	9
	0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1	11	'&'	10
			'Z'	11
	0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0			
	0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1		'''	12
	0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0	10	'J'	13
	0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1			
	0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0			
	0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1			
	0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0			
	0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 1			
	0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0			
	0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 1			
	0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 0			
	0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 1			
	0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0	9		
	0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1			
	0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 0			
	0 0 0 0 0 0 0 0 0 0 0 1 1 0 1 1			
	0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0			
	0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 1			
	0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 0			
	0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1			

FIG. 11A

SYMBOL	SYMBOL INDEX	BIT LENGTH	ASSIGNED CANONICAL HUFFMAN CODE LSB																						MSB
'0'	14	8	0	0	0	1	0																		0
'3'	15		0	0	1	1	1																		0
'4'	16		0	1	0	0	0																		0
'7'	17		0	1	0	1	1																		0
'8'	18		0	1	1	0	0																		0
'9'	19		0	1	1	1	1																		0
'1'	20	7	1	0	0	0																			0
'2'	21		1	0	1	0																			0
'5'	22		1	1	0	0																			0
'6'	23		1	1	1	0																			0
'F'	24		0	0	0	1																			0
'Y'	25		0	0	1	1																			0
0x20	26	6	0	1																					0
'B'	27		1	0																					0
'G'	28		1	1																					0
'H'	29		1	1																					0
'M'	30		0	0																					0
'P'	31		0	1																					0
'U'	32		1	0																					0
'V'	33		1	1																					0
'W'	34		0	1																					0

1102 1102 1102

FIG. 11B

ASSIGNED CANONICAL HUFFMAN CODE																	BIT LENGTH	SYMBOL	SYMBOL INDEX
MSB																LSB			
0	0	0	0	0		1	1	1	0	1							5	0x1B	35
0	0	1	0	1		1	0	0	1	0								'C'	36
0	1	0	1	0		1	0	0	0	1								'I'	37
0	1	1	0	1		1	0	0	1	0								'K'	38
0	1	1	1	0		1	0	0	1	1								'S'	39
1	0	0	0	0		1	0	1	0	0							4	0x1C	40
1	0	0	0	1		1	0	1	0	1								'A'	41
1	0	0	1	0		1	0	1	1	0								'D'	42
1	0	0	1	1		1	0	1	1	1								'E'	43
1	0	1	0	0		1	1	0	0	0								'L'	44
1	0	1	0	1		1	1	0	0	1								'N'	45
1	0	1	1	0		1	1	0	1	0								'O'	46
1	0	1	1	1		1	1	0	1	1								'R'	47
1	1	0	0	0		1	1	1	0	0								'T'	48
1	1	0	0	1		1	1	1	0	1								0X00	49
1102						1102													

FIG. 11C

TABLE INDEX	COMPARE VALUE	BITS USED	SYMBOL BASE INDEX
0	0000000000000000	16	0
1	0000000000000010	14	4
2	0000000000000100	13	5
3	0000000000000110	12	6
4	0000000000001000	11	7
5	0000000000001010	10	10
6	0000000000001100	9	12
7	0000000000001110	8	14
8	0000000000010000	7	20
9	0000000000010010	6	26
10	0000000000010100	5	35
11	0000000000010110	4	40

FIG. 12

TABLE INDEX	# BITS USED	SYMBOL	SEARCH TABLE START INDEX	SEARCH TABLE END INDEX
00000	5		0	7
00001	5		8	8
00010	5		8	9
00011	5		9	9
00100	5		9	9
00101	5		9	9
00110	5		9	9
00111	5	0x1B		
01000	5	'C'		
01001	5	'I'		
01010	5	'K'		
01011	5	'S'		
01100	4	0x1C		
01101	4	0x1C		
01110	4	'A'		
01111	4	'A'		
10000	4	'D'		
10001	4	'D'		
10010	4	'E'		
10011	4	'E'		
10100	4	'L'		
10101	4	'L'		
10110	4	'N'		
10111	4	'N'		
11000	4	'O'		
11001	4	'O'		
11010	4	'R'		
11011	4	'R'		
11100	4	'T'		
11101	4	'T'		
11110	4	0x0		
11111	4	0x0		

FIG. 13